Data Processing for Origin-Destination Survey

Study Team staff used the license plate database to match entering and exiting vehicles. The Study Team made the following assumptions in the database matching process:

1.   Unmatched exiting vehicles with District of Columbia and Maryland license plates were assumed to originate their trips in the study area.
2.   Unmatched entering vehicles were assumed to terminate their trips in the study area.
3.   25 percent of the unmatched volumes at the entry and exit points were assumed to have entered or exited the study area via streets where license plate data was not collected.
4.   The missed vehicles have the same travel patterns as the vehicles for which origin origin-destination matches were found.

In the first step of the license plate matching process, the Study Team developed a "raw" origin-destination trip matrix excluding unmatched vehicles and missed vehicles. In the second step, the Study Team used the assumptions listed above to determine a "total" origin-destination trip matrix for all vehicles entering and exiting the study area.

Trip Matrices and Findings of Origin-Destination Surveys

Tables 3 and 4 present the results of the vehicle matching for the study area during the AM peak period (6:45 AM – 9:15 AM). Tables 5 and 6 present the results of the vehicle matching for the study area during the PM peak period (3:00 PM – 5:30 PM). The matrices of origins and destinations shown in Tables 3 and 5 include the adjustments to account for unmatched and missed vehicles[1]. Figure 15 presents AM peak period license plate distribution. Figure 16 presents PM peak period license plate distribution. The main findings of the origin-destination survey results for the AM peak period are:

- Approximately 15 percent of the vehicles entering the study area are destined to locations within the study area, and approximately 13 percent of the vehicles exiting the study area originate their trips within the study area.
- The most used entry roadways are Georgia Avenue and New Hampshire Avenue.
- Over 300 vehicles that entered the study area via southbound Georgia Avenue left the study area at Blair Road. This indicates that a significant number of southbound commuters traverse the study area via Blair Road.
- The most used exit roadways are Georgia Avenue and Piney Branch Road.
- 27 percent of the vehicles destined to The Walter Reed Army Medical Center entered the study area traveling southbound on Georgia Avenue at Blair Road.
- Over 70 percent of the vehicles that exited the study area on Blair Road southbound at Peabody Street had Maryland license plates.
- Over 60 percent of the vehicles that exited the study area on Aspen Street westbound at Georgia Avenue had Maryland license plates.
- Over 70 percent of the vehicles that exited the study area on Piney Branch Road westbound at Georgia Avenue had Maryland license plates.

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[1] The unadjusted "raw" origin-destination matrices are included in Appendix D.

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Table 3. Origin-Destination Trips During the AM Peak Hours (6:45 AM – 9:15 AM)

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   Table 4: Origin-Destination Trips During the AM Peak Hours (6:45 AM – 9:15 AM) As Percentage of Exit Volumes

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Table 5: Origin-Destination Trips During the PM Peak Hours (3:00 – 5:30 PM)

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**Table 6: Origin-Destination Trips During the PM Peak Hours (3:00 – 5:30 PM)
As Percentage of Exit Volumes**

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Figure 15. AM Peak Period (6:45 AM – 9:15 AM) License Plate Distribution

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Figure 16. PM Peak Period (3:00 PM – 5:30 PM) License Plate Distribution

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The main findings of the origin-destination survey results for the PM peak period are:

- Approximately 15 percent of the vehicles entering the study area are destined to locations within the study area, and approximately 10 percent of the vehicles exiting the study area originate their trips within the study area.
- The most used exit roadway is Georgia Avenue, and the most used entry roadways are Blair Road, New Hampshire Avenue and Georgia Avenue.
- Approximately 540 vehicles that entered the study area northbound on Blair Road at Peabody Street left the study area via northbound Georgia Avenue at Blair Road. This indicates that a significant number of regional commuters traverse the study area during the PM peak period.
- Over 60 percent of the vehicles that entered the study area on Blair Road northbound at Peabody Street had Maryland license plates.
- Over 45 percent of the vehicles that entered the study area on Aspen Street eastbound at Georgia Avenue had Maryland license plates.
- Over 70 percent of the vehicles that entered the study area on Piney Branch Road westbound at Georgia Avenue had Maryland license plates.

SAFETY

In order to assess safety conditions in the study area, the Study Team obtained accident data of critical intersections from the District Department of Transportation (DDOT) and Maryland Department of Transportation for the years 1999 through 2001[1]. As Table 7 indicates, the intersections in the study area with the largest number of accidents in the last three years are Georgia Avenue at Eastern Avenue, Georgia Avenue at Piney Branch Road, Piney Branch Road at Blair Road, and Eastern Avenue at New Hampshire Avenue.

As summarized in the table, the intersection of Eastern Avenue and New Hampshire Avenue had an average of 11 accidents per year. A large proportion of the accidents occurred during off-peak hours. Left turn, rear end, side-swipe, and right angle collisions are the major types of collisions at this intersection. Improvements in signal timing and road design, and speed enforcement measures may be needed to improve the safety record at this intersection.

The intersection of Georgia Avenue and Piney Branch Road experienced an average of 10 accidents per year from the year of 1999 to the year of 2001. A large proportion of the accidents occurred during off-peak hours. There were eight different types of collisions at this location. The majority of collisions are left turn and rear end collisions. Excessive speeds contribute to these types of collisions. Speed enforcement, geometric improvements and signal timing modifications may be needed to improve the safety record at this location.

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[1] Year 2002 accident data was not available when the study was being conducted.

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Table 7
Summary of Accident Data

Intersection	Total Number of Accidents (Injuries)			AM Peak Hour Percentage			PM Peak Hour Percentage			Off-Peak Percentage			Accident Type(s)
	1999	2000	2001	1999	2000	2001	1999	2000	2001	1999	2000	2001	1999-2001
Georgia Avenue and Blair Road	1 (5)	1 (0)	3 (2)	0	0	0	0	100	67	100	0	33	Left Turn – 2 Rear End – 2 Parked - 1
Georgia Avenue and Eastern Avenue	12 (8)	6 (6)	3 (3)	8	0	0	50	17	0	42	83	100	Right Angle – 6 Left Turn - 7 Rear End - 2 Side Swiped – 2 Pedestrian – 1 Other - 2
Georgia Avenue and Aspen Street	5 (3)	N/A	N/A	0	N/A	N/A	20	N/A	N/A	80	N/A	N/A	Rear End – 1 Side Swiped – 2 Head On – 1 Parked - 1
Georgia Avenue and Piney Branch Road	14 (10)	4 (1)	11 (9)	7	0	18	36	75	0	57	25	82	Right Angle – 3 Left Turn - 7 Rear End - 6 Side Swiped – 4 Head On - 2 Fixed Object – 3 Ran Off Road – 1 Pedestrian – 2 Other - 1
Piney Branch Road and Aspen Street	1 (1)	3 (1)	6 (5)	0	0	33	0	0	17	100	100	50	Right Angle - 4 Rear End - 3 Side Swiped - 1 Head On - 1 Parked - 1
Piney Branch Road and Philadelphia Avenue	1 (0)	5 (2)	3 (2)	0	0	0	100	40	0	0	60	100	Rear End - 4 Angle - 4 Fixed Object - 1

N/A: Not Available

Appendix D presents the complete accident data worksheets used to generate the summary presented in Table 7.

Table 7
Summary of Accident Data
(Continued)

Intersection	Total Number of Accidents (Injuries)			AM Peak Hour Percentage			PM Peak Hour Percentage			Off-Peak Percentage			Accident Type(s)
	1999	2000	2001	1999	2000	2001	1999	2000	2001	1999	2000	2001	1999-2001
Piney Branch Road and Butternut Street	3 (2)	1 (0)	1 (0)	0	0	0	33	100	0	67	0	100	Left Turn - 1 Rear End - 2 Head On - 1 Fixed Object - 1
Piney Branch Road and Blair Road	10 (13)	2 (0)	5 (13)	0	0	0	10	0	0	90	100	100	Right Angle - 2 Left Turn - 7 Rear End - 3 Head On - 2 Fixed Object - 1 Ran Off Road - 1 Pedestrian - 1
Piney Branch Road and Eastern Avenue	5 (4)	N/A	N/A	60	N/A	N/A	20	N/A	N/A	20	N/A	N/A	Left Turn - 2 Head On - 1 Parked - 1 Other - 1
Blair Road and Eastern Avenue	2 (0)	1 (1)	N/A	50	0	N/A	0	0	N/A	50	100	N/A	Left Turn - 1 Rear End - 1 Other - 1
Blair Road and Cedar Street and 4th Street	1 (0)	4 (8)	N/A	0	25	N/A	0	25	N/A	100	50	N/A	Rear End - 2 Side Swiped - 2 Other - 1
Blair Road and Van Buren Street	1 (0)	3 (3)	2 (3)	0	0	0	0	0	0	100	100	100	Right Angle - 1 Rear End - 3 Side Swiped - 2 Other - 1

N/A: Not Available

Appendix D presents the complete accident data worksheets used to generate the summary presented in Table 7.

Table 7
Summary of Accident Data
(Continued)

Intersection	Total Number of Accidents (Injuries)			AM Peak Hour Percentage			PM Peak Hour Percentage			Off-Peak Percentage			Accident Type(s)
	1999	2000	2001	1999	2000	2001	1999	2000	2001	1999	2000	2001	1999-2001
Blair Road and Aspen Street	3 (1)	4 (4)	3 (5)	33	25	33	0	0	0	67	75	67	Right Angle - 2 Left Turn - 2 Rear End - 2 Head On - 1 Parked - 3
Carroll Street and Cedar Street	3 (2)	1 (0)	N/A	0	0	N/A	33	0	N/A	67	100	N/A	Parked - 1 Pedestrian - 1 Other - 2
Carroll Street and Maple Street	N/A	1 (0)	3 (3)	N/A	0	0	N/A	0	33	N/A	100	67	Left Turn - 1 Rear End - 1 Parked - 1 Other - 1
Carroll Avenue and Laurel Avenue	1 (0)	N/A	N/A	100	N/A	N/A	0	N/A	N/A	0	N/A	N/A	Rear End - 1
Eastern Avenue and Carroll Street	N/A	N/A	1 (0)	N/A	N/A	0	N/A	N/A	100	N/A	N/A	0	Head On - 1
Eastern Avenue and Laurel Street	N/A	5 (5)	N/A	N/A	20	N/A	N/A	20	N/A	N/A	60	N/A	Side Swiped - 1 Head On - 2 Pedestrian - 1 Other - 1
Eastern Avenue and Kansas Avenue	2 (0)	2 (4)	2 (1)	0	0	0	50	0	0	50	100	100	Right Angle - 2 Rear End - 1 Side Swiped - 2 Fixed Object - 1
Eastern Avenue and New Hampshire Avenue	8 (7)	15 (4)	11 (5)	0	7	0	13	27	27	87	66	73	Right Angle - 6 Left Turn - 9 Rear End - 8 Side Swiped - 7 Head On - 3 Other - 1

N/A: Not Available

Appendix D presents the complete accident data worksheets used to generate the summary presented in Table 7.

The intersection of Georgia Avenue and Eastern Avenue experienced an average of seven accidents per year. However, the total number of accidents decreased from 12 accidents during the year 1999 to three accidents during the year 2001. Most accidents happened during off-peak hours. Right angle and left turn collisions are two major types of collisions at this intersection. Geometric and signal modifications may be needed to improve the safety record at this location.

The intersection of Piney Branch Road and Blair Road experienced an average of six accidents per year. However, the total number of accidents decreased from 10 accidents during the year of 1999 to five accidents during the year of 2001. Most accidents happened during off-peak hours. Left turn collisions are the major type of collisions at this intersection. Speed enforcement and signal timing modifications would help improve the safety record at this intersection.

QUEUES AT CRITICAL INTERSECTIONS

Queuing observations were conducted at critical intersections to adequately develop a computerized model of existing traffic conditions. Maximum queue samples were taken at all approaches of critical intersections. The average of the maximum queues was then calculated. The average of the observed maximum queues for the critical intersections is summarized in Figure 17. As shown in the figure, the longest queues were observed on the southbound approach of New Hampshire Avenue at Eastern Avenue during the AM peak hour. Six lanes that narrow down to four lanes and construction on New Hampshire Avenue contributed to longer queues. Southbound Blair Road at Carroll Street was another approach where long queues were observed during the AM peak hour.

During the PM peak hour, the intersections where the longest queues were observed are: Blair Road northbound at Carroll Street/4th Street, Eastern Avenue eastbound at Kansas Avenue, Georgia Avenue southbound at Butternut Street, and Georgia Avenue northbound at Kalmia Road.

The queue information was used to validate the existing conditions traffic model. The results of the traffic simulations were compared to the observed queues. Where the Study Team found significant discrepancies between modeled conditions and observed conditions, the input data used to set up the model was thoroughly examined to eliminate the possibility of errors in the development of the model. After errors were ruled out, discrepancies were reconciled by making adjustments to the traffic model parameters to make the model replicate more accurately observed traffic conditions.

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Figure 17. ***Observed Maximum Queues at Critical Intersections***